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FOREST INSECT INVESTIGATIONS

PRELIMINARY REPORT ON FIRE STUDY PLOTS,

SUGAR HILL FIRE,

MODOC NATIONAL FOREST, CALIFORNIA

by

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PRELIMINARY REPORT ON FIRE STUDY PLOTS, SUGAR HILL FIRE, Modoc National Forest

One of the problems resulting from the Sugar Hill fire, July 1929, was the marking of fire-injured trees which were only partially defoliated. Much of the area covered by the fire was so severely burned that 100 per cent of the trees were fire-killed or so badly charred and defoliated that there was no possibility of survival. On a large part of the less severely burned areas, however, many trees were partially defoliated and charred which still had a chance of fairly rapid recovery. The decision as to which of the injured trees should be left and which removed in the salvage logging of the area was a difficult one. On the other hand, the destruction of a large percentage of all vegetation on much of the area made it especially desirable to leave as many trees as possible, both for reseeding and increment and for soil protection. But, on the other hand, the leaving of too many severely weakened trees would probably result in a western pine beetle epidemic which would cause the loss of many lightly injured and uninjured trees that would normally survive. Therefore it was important to determine as definitely as possible what trees would be most likely to survive the combined effects of fire injury and insect attack, so that all such trees could be left and all trees with little chance of survival cut.

Location and Description of Plots

For the purposes of this study two small sample plots were laid out for periodic examinations of selected trees.

The Willow Creek Plot includes an area of about 120 acres lying along both sides of Willow Creek, in the northeast quarter of Section 18, T 46 N, R 15 E. The elevation is about 5,400 feet. A variety of slopes and exposures are included, with a corresponding variety of degrees of fire injury. Most of the trees, however, were in fire-loss classes II to IV and V, with scarcely any in classes I and VI. This plot was selected outside of the salvage area, where no cutting is contemplated. One hundred trees were selected and given an initial examination between September 10 and October 2.

The Lassen Creek Plot is a smaller plot of about 80 acres, situated on a steep northeast slope on the crest side of Lassen Creek, in Section 31, T 46 N, R 15 E. The elevation is between 5,500 and 6,000 feet. This area was more severely burned than the Willow Creek plot, and a number of the trees were completely defoliated.

This plot is within the salvage area, and before it was laid out all the most severely injured trees had already been removed. Most of the remaining trees were in fire-injury classes II to V inclusive.

The area was burned over on July 23, the second day of the fire. The plot was laid out and the first tree examination made on October 5 and 10, 1929.

Methods

Since most of the important relationships between insects and fire in the western yellow pine type have been covered in the reports of Miller and Patterson, only supplementary studies were planned in connection with the Sugar Hill fire, the purpose being to determine as definitely as possible for this particular area what fire injury tree classes would be a safe risk if left for a later cut. The principal causes of death of the trees and the effect of fire injury on growth rate were also to be studied.

Definite boundaries were not established for the areas, and only those trees suited to the purpose of the study were included.

The system of tree classification used is about the same as that established by J.M. Miller and J.E. Patterson. It is as follows:

Fire Injury Class	Description
I	No fire injury
II	From 0 to 25% defoliation; no cambium injury
III	25 to 50% of needles killed; no cambium injury except possibly in spots around old fire scars
IV	50 to 75% of needles killed; little or no cambium injury
V	75 to 100% of needles killed; cambium injury light and spotted or absent
VI	100% of needles and terminal buds killed and cambium injury severe; fire killed trees

Since practically all the trees in Class I would survive and all in Class VI would die as a direct result of the fire, the trees in Classes II, III, IV and V were the ones of most interest in this study.

A two-man crew (Wagner and the writer) was used for marking the trees and recording the data. While one man took the diameter, tacked on the metal tag, carefully examined the lower part of the trunk, took an increment core and made a blaze to the inner bark, the other member of the crew made a complete record for each tree, including the following points: diameter, height, tree class, size and shape of crown; condition, including all injuries and evidence of disease; insect injury; fire injury, including class of fire injury, percentage of foliage killed, and amount and degree of cambium injury so far as could be determined from the base. The distribution of fire-killed foliage and cambium was also shown by a diagrammatic sketch.

Table I
Condition of Sample Trees

The following table gives the distribution of trees by fire injury classes:

Injury Class	Volume	Tot. Trees	Number of Trees		Volume bd.ft.	
			W.Cr.Pl.	L.Cr.Pl.	W.Cr.Pl.	L.Cr.Plot
II	32,080	35	15	20	11,920	20,160
III	37,320	44	28	16	24,730	12,590
IV	20,130	32	21	11	16,130	4,000
V	26,060	44	36	8	24,830	1,230
Total	115,590	155	100	55	77,610	37,980

The above table shows that there is a fairly even distribution of the different fire-injury classes in the trees being studied.

Table II
Lassen Creek Plot

Injury Class	Cambium Killed		Insects		
	No. of Trees	Per cent	Flatheads		Cerambycids
			No. Trees	Per cent	No. of Trees
II	9	45	0	0	0
III	11	69	0	0	0
IV	9	82	1		0
V	6	75	1		0
Total	35	Av. 64	Tot. 2	3.6	

Table III
Willow Creek Plot

Injury Class	Cambium Killed: No. of Trees	Cambium Killed: Per cent	Insects: Flatheads: No. Trees	Insects: Flatheads: Per cent	Insects: Cerambycids: No. of Trees	
II	6	40	0	0	0	
III	12	43	8	29	0	
IV	9	43	4	19	1	
V	20	56	12	33	3	
	Tot. 47	Av.47	To.24	Av.24	Tot. 4	4%

Subsequent Examinations

It is planned to examine each of the 155 tagged trees twice each year--in the early spring and in the fall--for the next two or three years and annually for a number of years thereafter. At the time of each examination the condition of each tree will be noted and a record made of the time, kind and amount of all insect damage. All trees that die will be felled and examined to determine the cause of death and the distribution and abundance of all insects present.

At one- or two-year intervals cores or chips will be taken from the trees to determine the growth rate since the fire.